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(54) **Binding device for snow boards.**

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EP 0 270 175 B1

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Description

The present invention is concerned with a binding device for a snow board, comprising first plate means fastenable onto the snow board and second plate means defining a support surface for a snow boot and having strap means for fastening the boot thereto.

The use is recent of one single ski to slide down snow-covered slopes instead of the traditional pair of skis used from time immemorial. The manoeuvres which the user must make a snow board carry out are substantially identical to those carried out by a pair of skis sliding in paired position.

But the movements the skier must carry out to drive a snow board are different from those which the same skier must carry out when driving a pair of skis, due to the monolithic character of the snow board, even if in both cases the necessary movements can all be reconducted to a shifting of the barycentre of the skier relatively to the equipment.

In such a situation, the binding devices interposed between the skier and the same equipment play a very important role, because they must be capable of allowing the skier barycentre to suitably move relatively to the snow board, but preventing the lower limbs from being constrained in abnormal and/or dangerous positions, with a consequent over-stressing of the articulations of the same limbs.

This problem has not yet been satisfactorily solved by the present binding devices, which substantially are of two types: the soft-structure binding devices, and the rigid-structure binding devices.

The soft-structure binding devices comprise an overboot of a flexible plastics material constrained to the snow board and suitable for containing a conventional après-ski boot. The fastening of the après-ski boot relatively to the overboot is carried out by means of hooks (with which the same overboot is equipped), which are adjustable in closure position, such to reconcile the dimensions of the après-ski boot with the desired value for the gripping force.

The structural flexibility of such binding devices makes it possible, in particular, the skier's ankle to be free in its articulation, but with the disadvantage of a lower protection of said ankle in case of a fall.

Furthermore, the muscles governing the ankle articulation are charged with most of the working load useful for carrying out the shiftings necessary for driving the snow board, with consequent rapid fatiguing thereof.

On the contrary, the flexibility of the binding device, together with the used boot, makes it any-

way possible to easily reach the natural opened-wide-apart position of the lower skier's limbs, such that the skier's knee may operate under optimum conditions.

As a consequence of the above, such types of binding devices are only preferable for a driving conduct on soft snow, which prefers precision to speed.

The rigid-structure binding devices comprise, on the contrary, a pair of plates joined to each other.

A first, base plate of said pair of plates is fastenable to the snow board, and a second, sole plate of said pair of plates is fastenable, in an adjustable position, to a downhill-ski boot. The sole plate is hence equipped with strap-shaped metal elements, which engage, in their gripping position, the corresponding hollows traditionally provided on the common downhill-ski boots.

Such binding devices, by being provided with a rigid bond, do not allow any movements to occur of the two plates relatively to each other, and hence of the ski boot sole relatively to the snow board.

As a consequence of the above, in as much as also the downhill-ski boot is rigid, the best conditions occur for the work of the skier's ankle, above all at high speeds, with the maximum protection of the same ankle in case of a falling.

The articulation of the skier's knee are however requested to compensate for the missed flexion of the ankle, imposed by the divergent position of the skier's limbs. Hence, both on the articulations of the skier's knee, and on the strap-shaped metal elements abnormal stresses take place. In particular, the strap-shaped metal elements undergo frequent breakages due to the stresses induced in them by the unavoidable attempts of rotation of the ski boot relatively to the sole plate.

The purpose of the present invention is to provide a binding device for snow boards capable of obviating the above drawbacks, such to allow the skier's lower limbs to assume an absolutely ergonomic and safe driving position, so to enable the skier to display a precise, and at the same time, fast, driving conduct.

Such purpose is achieved by a binding device for a snow board having the features claimed in claim 1.

The invention is illustrated, for purely exemplifying, and not limitative, purposes, in the figures on the hereto attached drawing sheets, wherein:

Figure 1 shows a perspective view of a binding device according to the present invention associated with a wedge element;

Figure 2 shows a plan view of the device of Figure 1;

Figure 3 shows a sectional view according to path III-III of Figure 2;

Figure 4 shows a view of a pair of binding devices mounted on a snow board.

Referring to the above mentioned Figures, the binding device of the invention, generally indicated by the reference numeral 1, substantially comprises first plate means fastenable to a snow board and second plate means fastenable to a snow boot, by means of strap means.

The first plate means are constituted by a single base plate 2, provided with sets of through bores 10 arranged along facing opposite circle arcs (for it to be adjustably bound to the snow board), whilst the second plate means are constituted by a toe plate 3 and a heel plate 4 hingedly connected to the base plate 2 by means of hinge means defining an axis extending in the longitudinal direction of the binding device 1.

The strap means with which the toe plate 3 and the heel plate 4 are provided, are constituted by a pair of metal straps, a first strap 5 and a second strap 6, respectively fastened at their ends to the toe plate 3 and the heel plate 4.

Both said metal straps 5 and 6 are formed by a metal cable 7 contained inside a spiral metal sheath 8.

The second strap 6 supports, on its middle, a lever cam 9 which engages, in its locking position, a suitable hollow provided in the snow boot (in this particular case, constituted by a downhill-ski boot, not shown in the Figures).

The hinge means interposed between the base plate 2 and the toe plate 3 and the heel plate 4 comprise a pair of independent hinges 14, one of said hinges being positioned between the base plate 2 and the toe plate 3, and the other being positioned between the base plate 2 and the heel plate 4. Each hinge 14 comprises a first set of flanges 11 integral with the base plate 2 and a second set of flanges 12 respectively integral with the toe plate 3 and with the heel plate 4.

The number of flanges 11 is larger than the number of flanges 12, such as to make it possible to change, as desired, the position of the toe plate 3 and of the heel plate 4 relatively to themselves, and to the base plate 2.

Both the flanges 11 and the flanges 12 are perforated at their top, so that through them a pin 13 passes. The pins 13 of each hinge 14 define a common axis 18 which is the axis about which the plates 3 and 4 are hinged relatively to the plate 2.

Each pin 13 comprises a stem, at whose first end there is a shaped head 15, having a triangle shape, such to prevent the same pin 13 from rotating about its axis. At the end of the stem of the pin 13 opposite to the head 15, means are provided, to prevent the same pin from exiting its seat within the flanges 11 and 12. These means are constituted by a split pin 16 engaging a through

bore 17 provided in the same pin 13.

The toe plate 3 and the heel plate 4 jointly define one single support surface 19 for the snow boot. The support surface 19 has a longitudinal middle axis 20 which is spaced apart from, and parallel to, the hinging axis 18 of the hinges 14 coincident with the axis of the pins 13.

In such way, the plates 3 and 4, in position of static load under the weight of the skier tend to naturally and automatically assume an inclined position relatively to the base plate 2.

Such position of the plates 3 and 4 enables the user of the snow board to easily maintain his dynamic equilibrium.

Both the toe plate 3 and the heel plate 4 comprise side retaining elements 21 for laterally holding the ski boot. Said side retaining elements 21 comprise upper invitation planes 22, which are oblique and convergent towards the support surface 19.

Under the support surface 19, and, therefore, under the toe plate 3 and under the heel plate 4, elastic elements are provided, which cushion the pivotal movement of the plates 3 and 4. The elastic elements are constituted by blocks 23 of such an elastic and yielding material as rubber, which are retained inside seats 24 positioned on the same side of the toe plate 3 and of the heel plate 4 relatively to the hinging axis 18 of the hinge 14, namely the side at which the minor projecting range of the plates 3 and 4 with respect to the axis 18 is provided.

The binding device 1 is optionally completed by wedge-shaped means, constituted by a wedge 25, which can be associated to the base plate 2 at the bottom side thereof to be interposed between the base plate 2 and the snow board 26.

Referring in particular to Figure 4, the wedge 25 is associated with the binding device 1 which, between the two binding devices which are necessary to drive each snow board 26, is the one which is positioned more rearwards relatively to the tip of the same snow board, such to enable the user to reach his optimum driving position.

The two binding devices 1 are mountable on the snow board in such a way that their relevant axes 18 and 20 are incident in a point external to the snow board and with an angular position which can be finely and selectively adjusted thanks to the plurality of combinations which can be realized due to the coincidence between the through bores 10 with screw-threaded blind bores 27 provided on the upper surface of the snow board 26.

The device of the invention, besides making it possible to perfectly drive the snow board both at high and at low speeds without excessively fatiguing the skier, who operates in a perfectly ergonomic position, offers further advantages:

a) the operations for the adjustment in position of the plates are so simple that they enable the user to carry out them also on the sliding track, in as much as no use of any tools is necessary;
b) the skier can discontinue using traditional skis, and directly start using a snow board, and vice-versa, with no need of replacing the type of snow boots he is wearing with another, purposely designed, type;

c) the operations of snow board hiring are simplified, such a simplification deriving from the combination of the advantages as of above (a) and (b) points;

d) it is possible to integrate both the heel plate and the toe plate with conventional safety binding devices as presently used on traditional skis, thus increasing the overall safety of the binding device of the invention;

e) through the binding devices, smaller stresses are transmitted to the snow boards, thanks to the central position of the hinges 14 which bind the base plate 2 to the toe plate 3 and to the heel plate 4. The presence of the hinges 14, and their central position prevents in fact bending momentums from being transmitted to the base plate 2, with the consequent elimination of the danger of pulling off the screws which bind the device to the snow board 26.

f) the hinges 14 are given a particularly strong structure thanks to the presence of a plurality of flanges 11 and 12 alternating to and opposite to one another, which transmit to the pin 13, which passes through them, only shear stresses, furthermore distributed throughout the length of the same pin;

g) also the first metal strap 5 and the second metal strap 6 undergo lower stresses, because any revolutionary impulses which can be generated between the ski boot sole and the underlying plates, with the overcharging of the straps 5 and 6, are absorbed by the hinges 14.

Claims

1. Binding device for a snow board, comprising first plate means (2) fastenable onto the snow board and second plate means (3,4) defining a support surface (19) for a snow boot and having strap means (5,6) for fastening the boot thereto, characterized in that said first plate means (2) and said second plate means (3,4) are hingedly connected to each other about a rotation axis (18) extending in the longitudinal direction of the binding device (1).
2. Binding device according to claim 1, characterized in that said first plate means comprise one single base plate (2) and said second

plate means comprise a toe plate (3) and a heel plate (4).

3. Binding device according to claim 2, characterized in that said toe plate (3) and said heel plate (4) are each provided with a metal strap (5,6) having ends fixed to said plates (3,4) for fastening a snow boot onto said plates (3,4).
4. Binding device according to claim 2, characterized in that independent hinges (14) are provided between said base plate (2) and respectively said toe and heel plates (3,4).
5. Binding device according to claim 4, characterized in that each hinge (14) comprises at least one flange (11) integral with said base plate (2) and at least one flange (12) integral respectively with said toe and said heel plate (3,4), and a pin (13) passing through said flanges (11,12).
6. Binding device according to claim 5, characterized in that the number of flanges (11) integral with said base plate (2) is greater than the number of flanges (12) integral with said toe and heel plate (3,4).
7. Binding device according to claim 5, characterized in that said pin (13) comprises a shaped head (15) preventing rotation of said pin (13) with respect to said plates (2; 3,4), and a stem having at its end opposite to the head (15) means for preventing said pin (13) from exiting its seat within said flanges (11,12).
8. Binding device according to claim 2, characterized in that said toe and heel plates (3,4) define one single support surface (19) having a longitudinal middle axis (20) which is spaced apart from, and parallel to, the hinging axis (18) of said plate means (2; 3,4).
9. Binding device according to claim 1, characterized in that elastic elements are interposed between said first and said second plate means (2; 3,4).
10. Binding device according to claim 9, characterized in that said elastic elements comprise blocks (23) of a yielding material housed inside seats (24) provided under said toe plate (3) and said heel plate (4).
11. Binding device according to claims 9 and 10, characterized in that said blocks (23) are positioned on a same side of said plates (2; 3,4) relative to the hinging axis (18), said side being

the one at which the smaller projecting range of said toe and heel plate (3,4) with respect to the hinging axis (18) is provided.

12. Binding device according to claim 3, characterized in that said metal straps (5,6) comprise a metal cable (7) coated by a spiral metal sheath (8). 5
13. Binding device according to claim 2, characterized in that said toe plate (3) and said heel plate (4) each comprise side retaining elements (21) for laterally holding a snow boot, said side retaining elements (21) having upper invitation planes (22) which are oblique and converge towards the support surface (19) defined by said toe and heel plate (3,4). 10
14. Binding device according to claim 1, characterized in that wedge means (25) are associated to said first plate means (2) at the bottom side thereof. 15
15. Binding device according to claim 1, characterized in that said first plate means (2) has a plurality of holes (10) arranged along facing opposite circle arcs for fastening said first plate means (2) in a selected one of a plurality of different angular positions on the snow board (26). 20
16. Arrangement of a pair of binding devices according to any one of the preceding claims on a snow board, wherein the hinging axes (18) of the binding devices (1) converge in a point external to the snow board (26). 25

Revendications

1. Dispositif de fixation pour planche à neige comprenant une première plaque (2) pouvant être fixée sur la planche à neige et une seconde plaque (3, 4) définissant une surface porteuse (19) pour une chaussure de neige et ayant des sangles (5, 6) pour la fixation de la chaussure à cette plaque, caractérisé en ce que la première plaque (2) et la seconde plaque (3, 4) sont réunies l'une à l'autre par une articulation autour d'un axe de rotation (18) s'étendant dans le sens longitudinal du dispositif de fixation (1). 30
2. Dispositif de fixation selon la revendication 1, caractérisé en ce que la première plaque comprend une unique plaque de base (2), et la seconde plaque comprend une plaque de pointe (3) et une plaque de talon (4). 35

3. Dispositif de fixation selon la revendication 2, caractérisé en ce que la plaque de pointe (3) et la plaque de talon (4) sont pourvues chacune d'une sangle métallique (5, 6) ayant des extrémités attachées auxdites plaques (3, 4) pour la fixation d'une chaussure de neige sur ces plaques (3, 4).

4. Dispositif de fixation selon la revendication 2, caractérisé en ce que des charnières indépendantes (14) sont prévues entre la plaque de base (2) et chacune respectivement des plaques de pointe et de talon (3, 4).

5. Dispositif de fixation selon la revendication 4, caractérisé en ce que chaque charnière (14) comprend au moins une branche (11) faisant partie intégrante de la plaque de base (2) et au moins une branche (12) faisant partie intégrante respectivement avec la plaque de pointe et la plaque de talon (3, 4), et un axe (13) passant à travers ces branches (11, 12).

6. Dispositif de fixation selon la revendication 5, caractérisé en ce que le nombre des branches (11) faisant partie intégrante de la plaque de base (2) est supérieur au nombre des branches (12) faisant partie intégrante de la plaque de pointe et de la plaque de talon (3, 4).

7. Dispositif de fixation selon la revendication 5, caractérisé en ce que l'axe (13) comprend une tête profilée (15) empêchant la rotation de cet axe (13) par rapport auxdites plaques (2 ; 3, 4) et une tige ayant à son extrémité opposée à la tête (15) un moyen empêchant cet axe (13) de sortir de son logement à l'intérieur desdites branches (11, 12).

8. Dispositif de fixation selon la revendication 2, caractérisé en ce que les plaques de pointe et de talon (3, 4) définissent une unique surface porteuse (19) ayant un axe médian longitudinal (20) qui est espacé de l'axe d'articulation (18), et parallèle à cet axe, des plaques (2) ; 3, 4).

9. Dispositif de fixation selon la revendication 1, caractérisé en ce que des éléments élastiques sont interposés entre la première plaque et la seconde plaque (2 ; 3, 4).

10. Dispositif de fixation selon la revendication 9, caractérisé en ce que lesdits éléments élastiques comprennent des blocs (23) d'une matière élastique logée à l'intérieur de sièges (24) prévus sous la plaque de pointe (3) et la plaque de talon (4).

11. Dispositif de fixation selon les revendications 9 et 10, caractérisé en ce que les blocs (23) sont disposés sur un même côté des plaques (2 ; 3, 4) par rapport à l'axe d'articulation (18), ce côté étant celui où se trouve la plus petite extension de la plaque de pointe et de la plaque de talon (3, 4) par rapport à l'axe d'articulation (18). 5
12. Dispositif de fixation selon la revendication 3, caractérisé en ce que les angles métalliques (5, 6) comprennent un câble métallique (7) couvert d'une gaine métallique (8) en spirale. 10
13. Dispositif de fixation selon la revendication 2, caractérisé en ce que la plaque de pointe (3) et la plaque de talon (4) comprennent chacune des éléments de retenue latéraux (21) pour tenir latéralement une chaussure de neige, ces éléments de retenue latéraux (21) ayant des plans récepteurs supérieurs (22) qui sont obliques et qui convergent en direction de la surface porteuse (19) définie par les plaques de pointe et de talon (3, 4). 15 20
14. Dispositif de fixation selon la revendication 1, caractérisé en ce que des coins (25) sont associés à la première plaque (2) du côté inférieur de celle-ci. 25
15. Dispositif de fixation selon la revendication 1, caractérisé en ce que la première plaque (2) a une pluralité de trous (10) disposés le long d'arcs de cercle opposés l'un à l'autre pour la fixation de la première plaque (2) sur la planche à neige (26) à l'une d'une pluralité de positions angulaires différentes. 30 35
16. Arrangement d'une paire de dispositifs de fixation selon l'une quelconque des revendications précédentes, sur une planche à neige, selon lequel les axes d'articulation (18) des dispositifs de fixation (1) convergent vers un point extérieur à la planche à neige (26). 40 45
2. Bindungsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die ersten Plattenmittel eine einzelne Basisplatte (2) und die zweiten Plattenmittel eine Zehenplatte (3) und eine Fersenplatte (4) umfassen.
3. Bindungsvorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Zehenplatte (3) und die Fersenplatte (4) jeweils mit Metallriemen bzw. -bügel (5,6) ausgebildet sind, deren Enden an den Platten (3,4) zur Festlegung eines Schuhs an diesen Platten (3,4) befestigt sind.
4. Bindungsvorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß zwischen der Basisplatte (2) und der Zehen- bzw. Fersenplatte (3,4) unabhängige Gelenke (14) vorgesehen sind.
5. Bindungsvorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß jedes Gelenk (14) wenigstens einen mit der Basisplatte (2) verbundenen Flansch (11) und jeweils wenigstens einen mit der Zehenplatte bzw. Fersenplatte (3,4) verbundenen Flansch (12) umfaßt, wobei sich ein Zapfen (13) durch die Flansche (11,12) erstreckt.
6. Bindungsvorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß die Anzahl der mit der Basisplatte (2) verbundenen Flansche (11) größer ist als die Anzahl der mit der Zehenplatte und Fersenplatte (3,4) verbundenen Flansche (12).
7. Bindungsvorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß der Zapfen (13) einen geformten Kopf (15), welcher eine Rotation des Zapfens (13) relativ zu den Platten (2,3,4) verhindert, und einen Schaft aufweist, welcher an seinem dem Kopf (15) gegenüberliegenden Ende Mittel zur Verhinderung des Austretens des Zapfens (13) aus seinem Sitz in den Flanschen (11,12) aufweist.
8. Bindungsvorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Zehen- und Fersenplatte (3,4) eine einzige Supportfläche (19) mit einer Längsmittelachse (20) definieren, welche in Abstand von und parallel zur Gelenkachse (18) der Plattenmittel (2,3,4) verläuft.
9. Bindungsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß zwischen den ersten und zweiten Plattenmittel (2,3,4) elastische Elemente zwischengeschaltet sind.

Patentansprüche

1. Bindungsvorrichtung für Schneebrett mit ersten, am Schneebrett befestigbaren Plattenmitteln (2) und zweiten Plattenmitteln (3,4), welche eine Supportfläche (19) für einen Schuh definieren und Befestigungsmittel (5,6) zur Festlegung des Schuhs aufweisen, dadurch gekennzeichnet, daß die ersten Plattenmittel (2) und zweiten Plattenmittel (3,4) um eine Rotationsachse (18), welche sich in Längsrichtung der Bindungsvorrichtung (1) erstreckt, gelenkig miteinander verbunden sind. 50 55

10. Bindungsvorrichtung nach Anspruch 9, dadurch gekennzeichnet, daß die elastischen Elemente Blöcke (23) aus nachgiebigem Material umfassen, welche in Sitzen (24) unter der Zehenplatte (3) und der Fersenplatte (4) angeordnet sind. 5
11. Bindungsvorrichtung nach Anspruch 9 und 10, dadurch gekennzeichnet, daß die Blöcke (23) relativ zur Gelenkachse (18) auf der selben Seite der Platten (2,3,4) angeordnet sind, wobei an dieser Seite der relativ zur Gelenkachse (18) geringer vorstehende Bereich der Zehen- und Fersenplatte (3,4) vorgesehen ist. 10
15
12. Bindungsvorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die Metallriemen (5,6) ein Metallkabel (7) umfassen, welches von einer spiralförmigen Metallhülse (8) ummantelt ist. 20
13. Bindungsvorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Zehenplatte (3) und die Fersenplatte (4) jeweils seitliche Rückhaltemittel (21) zum seitlichen Halten des Schuhs aufweisen, wobei die seitlichen Rückhaltemittel (21) obere Einbringebeinen (22) aufweisen, welche geneigt angeordnet sind und zur von der Zehen- und Fersenplatte (3,4) definierten Supportfläche (19) konvergieren. 25
30
14. Bindungsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß den ersten Plattenmitteln (2) an ihrer Unterseite Keilmittel (25) zugeordnet sind. 35
15. Bindungsvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die ersten Plattenmittel (2) eine Vielzahl von Öffnungen (10) aufweisen, welche längs einander gegenüberliegenden Kreisbögen entgegengesetzter Krümmung zur Befestigung der ersten Plattenmittel (2) in einer aus einer Vielzahl von unterschiedlichen Winkelpositionen am Schneebrett (26) ausgewählten Position angeordnet sind. 40
45
16. Anordnung eines Paares von Bindungsvorrichtungen gemäß einem der vorangehenden Ansprüche auf einem Schneebrett, wobei die Gelenkachsen (18) der Bindungsvorrichtungen (1) sich in einem außerhalb des Schneebrettes (26) liegenden Punkt schneiden bzw. kreuzen. 50

55

Fig.1

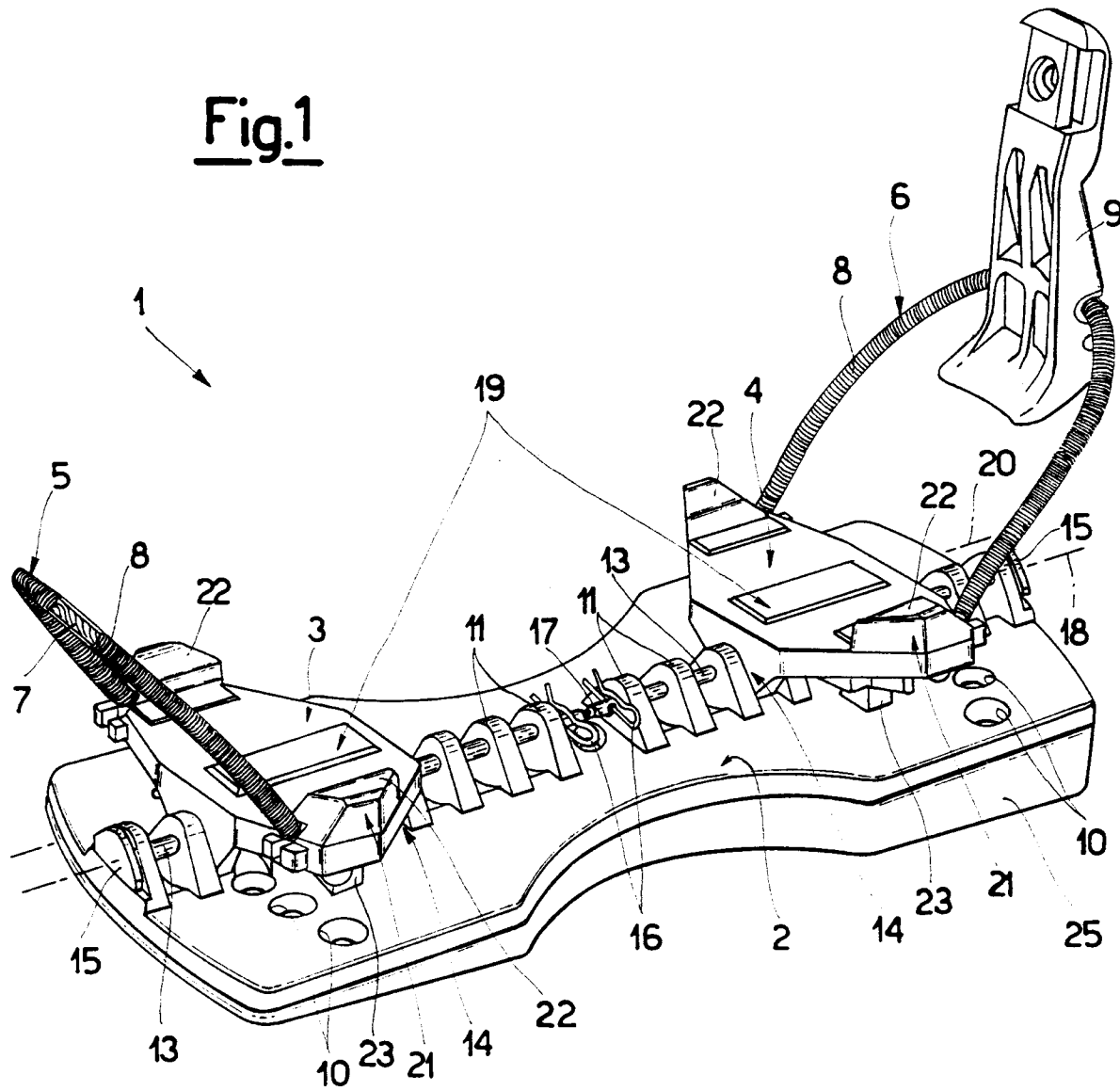


Fig.4

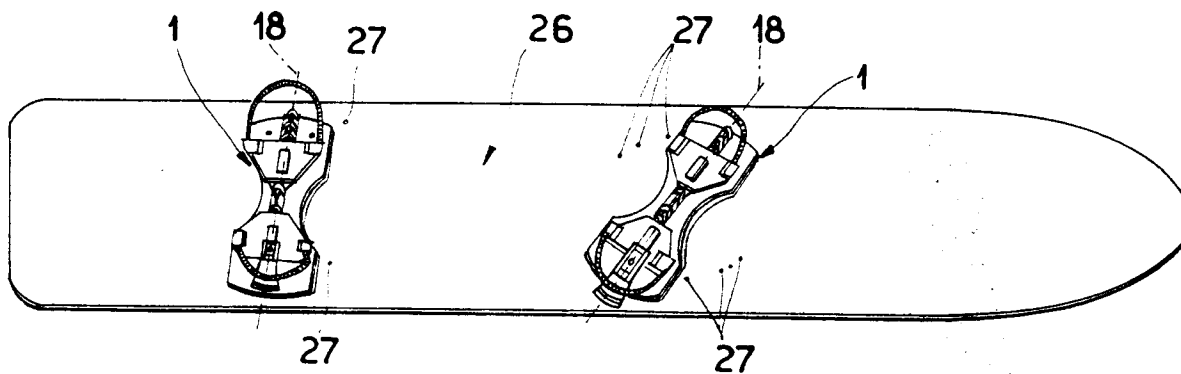


Fig.2

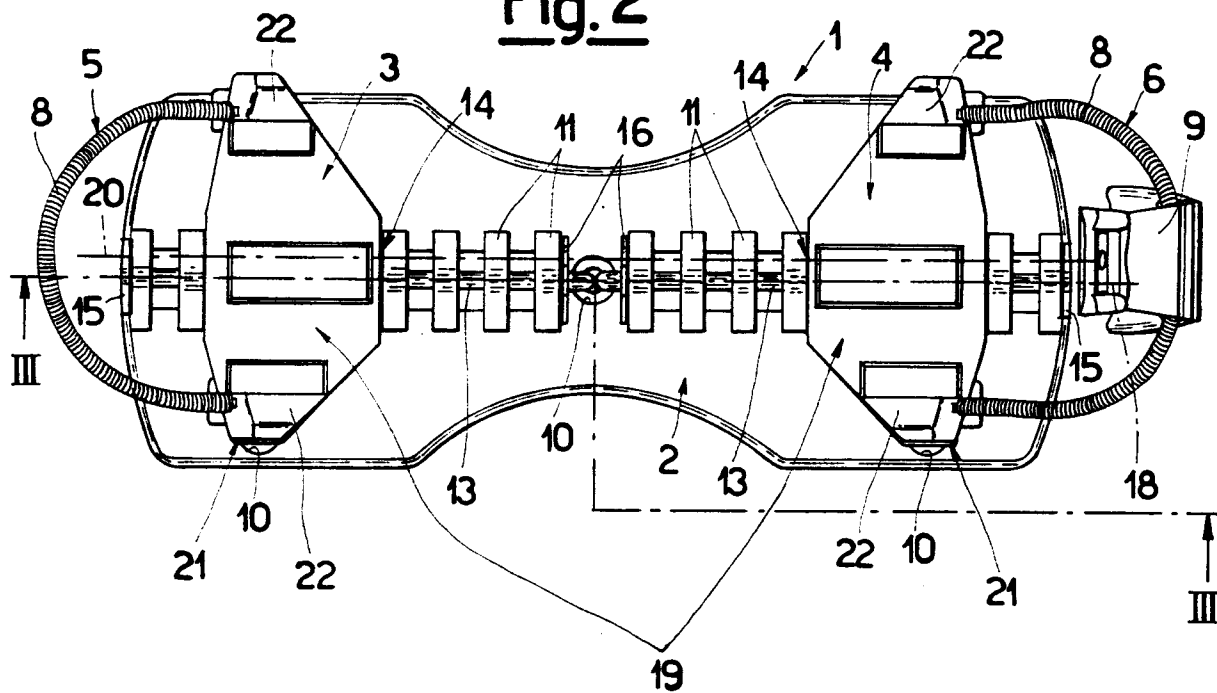


Fig.3

